

The history of the expedition has been compiled by Cav. De Filippi, and it is clear from his narrative that the expedition required great personal strength, courage, and endurance. The Prince and his two guides were badly smitten with snow blindness after the ascent of Mount Stanley, for they had to work all day in a glaring white fog, which was too dense to allow the use of goggles. The author mentions (p. 243) that the Prince spent seventeen days above the height of 13,000 feet, with a very light equipment, sleeping with the two guides in a Whymper tent, without a camp bed, and with clothes nearly always soaked with rain and snow. The climbing was in places very difficult, and the dangers were increased by the prevailing mists and bad weather. Some of the ascents taxed the skill of such expert climbers as the Prince and his two guides; but others were easy; thus the highest point of Mount Speke, 16,080 feet, though snow covered, did not require the use of the rope.

Commander Cagni, the surveyor of the expedition, has compiled a full sketch-map of Ruwenzori, including all its snow-covered peaks. The topographic data are stated in appendices. The mountains are illustrated by a series of magnificent photographic panoramas by Sella. The survey shows that the snow-capped peaks of Ruwenzori are arranged in a line curved like the letter G. Going from the upper point of the G to the tail, the peaks in succession are Mount Gessi, Mount Emin, Mount Speke, Mount Stanley—which includes the highest peaks of the ridge—Mount Baker, and at the end of the tail of the G is Mount Luigi de Savoia. The height of the highest point, Mount Margherita on Mount Stanley, is given as 16,815 feet.

The nomenclature is very carefully explained, and a table of synonyms (pp. 218-9) will be useful, as geographers are above rules of priority. Stühlmann's early names are quietly put aside, and the proposed native names are also rejected. There had been considerable confusion in the application of the early names, but this is perhaps hardly likely to be removed by some of the changes. For the worst alteration of names, the Prince, however, is not responsible, as he only yielded to the wish of the Geographical Society. It naturally desired that the Prince's name should be attached to one of five mountains, but unfortunately selected the one that had been named Mount Moebius by Stühlmann years earlier. The name Moebius has, therefore, been transferred to a minor peak in the central part of the range. The peaks called by Stühlmann Mount Semper are re-christened the Alexandra and Margherita peaks of Mount Stanley.

The full scientific results are being published in a supplementary volume which has not been translated, but some account of the results is included. The geological collections and geological sketch-map of the central part of Ruwenzori fully confirm the Archean age of its rocks, as to which doubt had been suggested by Mr. Wollaston's description of craters and crater-lakes; the author refers to some veins of basalt in the gneiss (p. 222) as the only formation on Ruwenzori of a volcanic nature, and such veins do not necessarily indicate volcanic action. The glaciers are proved to be ice-caps or calottes, with the glaciers extending as finger-shaped processes. The snow limit is at present at the height of from 14,700 to 14,800 feet, but it is now suggested that the glaciers extended even lower than was claimed by Scott Elliot. The evidence on which this low-level glaciation is based is, however, not given, and some doubt as to its value is raised by the remark that the exfoliation surfaces of

granite, the characteristic weathering of granite in the tropics, are "somewhat similar to the rocks known as moutonnées in regions which have passed through a glacial period" (p. 91). However, as the rainfall in Ruwenzori is probably exceptionally heavy, it may well be that the glaciers there reached a lower level than on Mount Kenya. All students of African geography, and all interested in mountain exploration, will feel indebted to the Duke of the Abruzzi for the brilliant feat of travel by which he has wrested from the clouds of Ruwenzori the secrets they have concealed so long.

J. W. GREGORY.

#### SOME ASPECTS OF THE WHEAT PROBLEM.<sup>1</sup>

FEW agricultural problems appeal to a wider circle both among agriculturists and the general public than wheat production; the layman often considers it to be the farmer's chief business, and many farmers are still to be found who look back with regret on the days when it actually was so.

The area under wheat in the whole world exceeds 200 million acres, and something like 400 million quarters are raised. About 220 million quarters are grown in Europe, Russia being the chief producer, followed by France, Hungary, and Italy; 107 million quarters are grown on the American continent (more than 75 million in the United States, 20 million in the Argentine, and 10 million in Canada), and about 53 million quarters in Asia, three-fourths of which comes from India. It is noteworthy that the wheat area tends to decrease in old and highly farmed countries, but to expand in new countries or in old, backward countries just beginning to utilise their resources. To a certain extent, wheat is, therefore, a pioneer crop, and is relatively more important in the early stages of development of a country than later on when it simply takes its place in the rotation with other crops. It cannot remain so indefinitely, but there are still immense tracts to which it can spread. It requires warm, sunny summers, and not too much rain; indeed, it can do with astonishingly little rain if appropriate cultivation methods are adopted; where the summers are suitable, severe winters are no bar to the cultivation of wheat, though they may limit the yield.

The fact that wheat is one of the first crops grown in a new country renders necessary a thorough study of the effect of external conditions such as soil, climate, and manuring on its development. Much still remains to be done, especially with regard to the influence of water supply. There are also important breeding problems. No crop can be successfully grown on a large scale unless it is adapted to the local conditions, tolerably resistant to the local diseases, and commands an adequate price in the market. The first two conditions afford fairly straightforward problems. Wheats suitable to a given district are usually found by trying a number of varieties, and then improving on the most promising by the slow and mechanical process of selection—in other words, waiting for a "mutation" form to turn up. Resistance to rust, one of the worst diseases of wheat, has been shown by Biffen to be in all probability a Mendelian character; it should, therefore,

<sup>1</sup> A. E. Humphries: *Journal of the Royal Society of Arts*, No. 2934; A. Howard and G. L. C. Howard: *Bulletin* 14, *Agricultural Research Institute, Pusa*; A. E. V. Richardson: *Journal of Agriculture of South Australia*, vol. xii., No. 6; K. J. J. Mackenzie: *Journal of the Board of Agriculture*, vol. xv., No. 10.

only be a matter of time to obtain rust-resisting varieties. Saleability in the market is a somewhat artificial affair. At the present time millers require a "hard" wheat yielding a "strong" flour rather than a "weak" wheat, and, therefore, pay more for it. It is not claimed that strong wheat is more nutritious, but merely that it makes larger and more shapely loaves; there is the further advantage to the baker that a given quantity of strong flour makes a greater weight of bread because it takes up and retains more moisture than an equal weight of weak flour. No doubt an excellent case could be made out for "weak" flour, but that is not the business of the agriculturist; he has simply to provide what his customer wants. The scientific problem of discovering what constitutes strength is under investigation, and the fact that strength is inherited indicates the possibility of crossing it on to wheats possessing other desirable features.

The economic problems in wheat production have rarely been stated better than in Mr. Humphries's lecture before the Royal Society of Arts. For a number of years past British wheat has been sold at prices substantially lower than the best foreign wheat because it lacks strength. Probably few bakers would risk making bread from British wheat alone; they require foreign wheat to be mixed with it. Consequently, the mills are handicapped unless they are within easy access of a seaport. The Home-grown Wheat Association are trying to find whether strong wheat can be profitably produced in England; their experiments have already shown that strength is inherent in the variety, and is not the result of external conditions, though it is influenced by them; they have also demonstrated that the great Canadian wheat, Red Fife, keeps its strength when grown here. The Canadian farmer is satisfied with 20 bushels to the acre, but the British farmer, having heavier charges to meet, must get more than 30, and on occasions, in favourable districts, will even get 60 or more bushels of grain and good crops of straw. Unfortunately, Red Fife does not give these heavy crops, and is, therefore, not in much favour here. It is hoped, however, that crosses combining the strength of Red Fife with the cropping power of the standard English varieties will in time be available.

Other countries are also seeking to improve the strength of their wheats. Indian wheat, for instance, is at present no stronger than ours, but Mr. and Mrs. Howard have grown wheats at Pusa which were very favourably reported on by the English milling expert who examined them. One especially was praised, a wheat (Pusa 6) selected in 1906 and grown from a single plant. It has the further advantage that it is resistant to rust, and matures well even on second-class wheat soils. Canadian wheats are under constant investigation at Ottawa. The Agricultural Department of South Australia also conducts experiments, the results of which appear from time to time in its journal.

The introduction of strong wheats into English agriculture would unquestionably alter the conditions of wheat-growing here, and whilst strong varieties are being raised it is desirable to ascertain the precise cost of wheat production by modern methods and using modern labour-saving appliances. There is a great deal of work to be done in this direction. Mr. Mackenzie's paper in the *Journal of the Board of Agriculture* provides data for ascertaining the cost of harvesting; similar records for other operations are badly needed.

E. J. RUSSELL.

#### THE LONDON INSTITUTION.

AT the annual meeting of the proprietors of the London Institution, held on April 28, it was announced that, in view of the appointment of the Royal Commission on University Education in London, which had officially informed the Institution that they regarded it as coming under their purview, the scheme for amalgamation with the Royal Society of Arts must remain in abeyance. The solicitor of the institution had advised that Parliament would not pass a Bill altering the status of an institution the position of which was already under the consideration of a Royal Commission, and, assuming that opinion to be sound, as it probably is, it would certainly be inexpedient immediately to proceed with the Royal Society of Arts scheme, or any other that involved an Act of Parliament. A considerable opposition to the ratification of the scheme had been worked up, and an attempt was to be made to alter the constitution of the board, but upon the announcement that the scheme was not to be proceeded with at present, the opposition to the existing board was withdrawn. Whether the scheme which has now been shelved, at any rate for the present session, will be revived after the Royal Commission on University Education in London has reported is very doubtful.

From the outset the Royal Society of Arts has been unwilling to be a party to the scheme unless there was something like practical unanimity on the part of members of the London Institution. If the management of that institution had been in stronger hands it is probable that little would have been heard of opposition. Very similar opposition to the proposal to dispose of the Zoological Society's freehold premises in Hanover Square, and to expend the proceeds in providing suitable accommodation for the Society's offices and library at the Zoological Gardens, was summarily dealt with on April 29. But there seems to have been no strong hand at the helm at the London Institution, and the final result will probably be that a scheme which would have been of considerable benefit to two important institutions will fall through. The idea seems to be to make the London Institution a sort of school of economics, an excellent thing in itself, but not wanted, seeing that there is already existing an institution amply able to meet the requirements of the public in this direction.

At the meeting last week Lord Aldenham stated that the managers had received a letter from the Corporation asking whether they were open to receive proposals, and they answered in the affirmative, but no definite suggestion has been received from that source. Probably the best thing to do with the institution, if the scheme of amalgamation with the Royal Society of Arts is to fall through, would be to sell its land, and whatever else it has to sell, and divide the proceeds, so far as other claims permit, amongst certain educational institutions in the City.

#### NOTES.

THE first of the two annual soirees of the Royal Society will be held on Wednesday next, May 12.

WE announce with regret the death of Dr. F. G. Yeo, F.R.S., emeritus professor of physiology, King's College, London, at sixty-four years of age.

WE regret to see the announcement of the death, at seventy-five years of age, of Dr. J. Marshall Lang, Chancellor and Principal of Aberdeen University since 1900.